Plant Physiol. (1990) 92, xxiv–xxvi
0032-0889/90/92/0000/04/$01.00/0

Author Index

A

Abel, Steffen, 970
Adams, William W., III, 293, 302, 1184
Algarra, Patricia, 570
Altabella, Teresa, 703
Ancibor, Elena, 931
Andreo, Carlos S., 66
Anthon, Gordon E., 346
Antognoni, Fabiana, 690
Apperley, David C., 61
Arzee, Tova, 1075
Asbury, Linda R., 419
Ashworth, Edward N., 718
Askerlund, Per, 871
Atkinson, Merelee M., 215

B

Bacon, Charles W., 726
Bae, Kaesun, 12
Bagni, Nello, 690
Baker, C. Jacyn, 215
Baldi, Bruce G., 547
Balke, Nelson E., 1121
Barlow, Edward W., 977
Barthe, Philippe, 1148, 1164
Barton, Carolyn R., 881
Bauer, Wolfgang D., 368
Bedinger, Patricia A., 474
Bedmar, Eulogio J., 983
Beers, Eric P., 1154
Belanger, Faith C., 1133
Below, Frederick E., 160
Benedict, Chaucer R., 816
Benhamou, Nicole, 995, 1108
Bennett, John, 891
Bensen, Robert J., 205
Berkowitz, Gerald A., 733
Biggs, Karen J., 197
Bilger, Wolfgang, 293
Biswas, Asok K., 506
Björkman, Olle, 293
Black, M. Kay, 456
Blevins, Dale G., 602
Bonnemain, Jean-Louis, 97
Bourquin, Sophie, 97
Bousser, Agnès, 79
Bouton, Joseph H., 186
Boyer, John S., 205
Boyle, Sheila A., 151
Bracho, Geracimo E., 381, 386
Bradford, Kent J., 1029, 1038, 1046
Brauer, David, 672
Briggs, Winslow R., 179, 434
Brishammar, Sture, 222
Briskin, Donald P., 747
Brodl, Mark R., 1133
Brown, R. Harold, 186
Bruce-Carver, Megan R., 88
Bryan, John K., 785
Burnell, James N., 37
Burtin, D., 912
Burton, James D., 1220
Bush, Douglas S., 506
Byrd, George T., 186

C

Caboche, Michel, 659
Caetano-Anollés, Gustavo, 368
Campbell, Wilbur H., 1
Campbell, William J., 110
Cannon, Gordon C., 939
Carbonell, Juan, 1070
Carrasco, Pedro, 1070
Castelfranco, Paul A., 172
Cerezo, Alberto S., 931
Cervantes-Cervantes, Miguel, 1241
Cerwick, Sharon, 755, 761
Chamberland, Hélene, 995
Chartier, Yvette, 520
Chen, Tsung-Hsien, 531
Chérel, Isabelle, 659
Chilton, W. Scott, 1226
Chow, Te-Jin, 531
Chrispeels, Maarten J., 703
Cliquet, Jean-Bernard, 79
Cocucci, Sergio, 908
Conejero, Vicente, 227
Conroy, Jann P., 977
Copes, Donald O., 1244
Creelman, Robert A., 205
Croes, Anton F., 565, 582
Curir, Paolo, 1148
Czygan, Franz-Christian, 293

D

Dagan, Eliahu, 48
Dalkin, Karen, 440
Dancer, Jane, 637
Danner, Stephanie, 881
Da Silva, Maria C., 797
Dean, John V., 467
de Armas, Roberto, 679
De Clercq, Ann, 899
Deléens, Eliane, 79
Delrot, Serge, 97
Demmig-Adams, Barbara, 293, 302
Dennis, David T., 151, 155
De Rycke, Riet, 899
De Wit, Pierre J. G. M., 1108
Dharma, Abdi, 88
Dietz, Karl-Joseph, 123
Di Nola, Liliana, 427
Dittrich, Andreas P. M., 846
Dixon, Richard A., 440, 447
Doehlert, Douglas C., 990
Dolci, Marcello, 1148
Dry, Ian B., 265
Duke, Stanley H., 614, 1154
Duysen, Murray, 1233

E

Eberlein, Charlotte V., 467
Ebert, Edith, 924
Echeverria, Ed, 168
Edgerton, Michael D., 474
Edington, Brent, 440
Edwards, Robert, 440
Eide, John, 1233
Emerich, David W., 346
Emmerich, William E., 462
Engström, Peter, 1174
Eriksson, Tage, 1174
Eskins, Ken, 1233
Evans, John J., 726
Evans, Michael L., 310, 792

F

Falkowski, Paul G., 891
Farquhar, Graham D., 534
Fathi, Marion, 710
Feather, Milton S., 1014
Feenstra, Will J., 234
Ferguson, David L., 740
Fernando, Mala, 1128
Fleet, George, 413
Fock, Heinrich P., 1053
Fondren, W. Mark, 310
Forsythe, Kathlene L., 1014
Foster, Michael A., 816
Fredeen, Arthur L., 29
Fredrikson, Karin, 871
Fritig, Bernard, 520
Fry, Stephen C., 197

G

Gamon, John A., 487
Garello, Ginette, 1164
Gelvin, Stanton B., 281
Gengenbach, Burle G., 1220
Georgii, Hans-Walter, 560
Ghisi, Rosella, 846
Gibbs, Mark J., 37
Glass, Anthony D. M., 1128
Glund, Konrad, 970
Goldstein, Guillermo, 130
Gonneau, Martine, 659
Gonzales, Andrea P., 88
Goren, Raphael, 48, 54
Gowri, G., 1
Goyal, Arun, 621, 630
Gracz, Hanna, 1014
Gradziel, Thomas M., 334
Grantz, David A., 130
Green, Pat D., 262
Greenblatt, Gerald A., 816
Greyson, Maureen F., 155
Gronwald, John W., 467, 1220
Gross, Wiltrud, 41
Grosset, Jean, 520
Guerin, Vincent, 595
Guerrero, Miguel G., 886
Guikema, James A., 262, 648, 654, 740
Guillemaut, Pierre, 136

H

Hadjeb, Nouréddine, 1241
Hammer, Graeme L., 534
Hardegree, Stuart P., 462
Harding, Scott A., 648, 654
Harper, James E., 1142
Hartwig, Ueli A., 116
Hase, Eiji, 802

Plant Physiol. (1990) 92, xxiv–xxvi
0032-0889/90/92/0000/04/$01.00/0

Author Index

A

Abel, Steffen, 970
Adams, William W., III, 293, 302, 1184
Algarra, Patricia, 570
Altabella, Teresa, 703
Ancibor, Elena, 931
Andreo, Carlos S., 66
Anthon, Gordon E., 346
Antognoni, Fabiana, 690
Apperley, David C., 61
Arzee, Tova, 1075
Asbury, Linda R., 419
Ashworth, Edward N., 718
Askerlund, Per, 871
Atkinson, Merelee M., 215

B

Bacon, Charles W., 726
Bae, Kaesun, 12
Bagni, Nello, 690
Baker, C. Jacyn, 215
Baldi, Bruce G., 547
Balke, Nelson E., 1121
Barlow, Edward W., 977
Barthe, Philippe, 1148, 1164
Barton, Carolyn R., 881
Bauer, Wolfgang D., 368
Bedinger, Patricia A., 474
Bedmar, Eulogio J., 983
Beers, Eric P., 1154
Belanger, Faith C., 1133
Below, Frederick E., 160
Benedict, Chaucer R., 816
Benhamou, Nicole, 995, 1108
Bennett, John, 891
Bensen, Robert J., 205
Berkowitz, Gerald A., 733
Biggs, Karen J., 197
Bilger, Wolfgang, 293
Biswas, Asok K., 506
Björkman, Olle, 293
Black, M. Kay, 456
Blevins, Dale G., 602
Bonnemain, Jean-Louis, 97
Bourquin, Sophie, 97
Bousser, Agnès, 79
Bouton, Joseph H., 186
Boyer, John S., 205
Boyle, Sheila A., 151
Bracho, Geracimo E., 381, 386
Bradford, Kent J., 1029, 1038, 1046
Brauer, David, 672
Briggs, Winslow R., 179, 434
Brishammar, Sture, 222
Briskin, Donald P., 747
Brodl, Mark R., 1133
Brown, R. Harold, 186
Bruce-Carver, Megan R., 88
Bryan, John K., 785
Burnell, James N., 37
Burtin, D., 912
Burton, James D., 1220
Bush, Douglas S., 506
Byrd, George T., 186

C

Caboche, Michel, 659
Caetano-Anollés, Gustavo, 368
Campbell, Wilbur H., 1
Campbell, William J., 110
Cannon, Gordon C., 939
Carbonell, Juan, 1070
Carrasco, Pedro, 1070
Castelfranco, Paul A., 172
Cerezo, Alberto S., 931
Cervantes-Cervantes, Miguel, 1241
Cerwick, Sharon, 755, 761
Chamberland, Hélene, 995
Chartier, Yvette, 520
Chen, Tsung-Hsien, 531
Chérel, Isabelle, 659
Chilton, W. Scott, 1226
Chow, Te-Jin, 531
Chrispeels, Maarten J., 703
Cliquet, Jean-Bernard, 79
Cocucci, Sergio, 908
Conejero, Vicente, 227
Conroy, Jann P., 977
Copes, Donald O., 1244
Creelman, Robert A., 205
Croes, Anton F., 565, 582
Curir, Paolo, 1148
Czygan, Franz-Christian, 293

D

Dagan, Eliahu, 48
Dalkin, Karen, 440
Dancer, Jane, 637
Danner, Stephanie, 881
Da Silva, Maria C., 797
Dean, John V., 467
de Armas, Roberto, 679
De Clercq, Ann, 899
Deléens, Eliane, 79
Delrot, Serge, 97
Demmig-Adams, Barbara, 293, 302
Dennis, David T., 151, 155
De Rycke, Riet, 899
De Wit, Pierre J. G. M., 1108
Dharma, Abdi, 88
Dietz, Karl-Joseph, 123
Di Nola, Liliana, 427
Dittrich, Andreas P. M., 846
Dixon, Richard A., 440, 447
Doehlert, Douglas C., 990
Dolci, Marcello, 1148
Dry, Ian B., 265
Duke, Stanley H., 614, 1154
Duysen, Murray, 1233

E

Eberlein, Charlotte V., 467
Ebert, Edith, 924
Echeverria, Ed, 168
Edgerton, Michael D., 474
Edington, Brent, 440
Edwards, Robert, 440
Eide, John, 1233
Emerich, David W., 346
Emmerich, William E., 462
Engström, Peter, 1174
Eriksson, Tage, 1174
Eskins, Ken, 1233
Evans, John J., 726
Evans, Michael L., 310, 792

F

Falkowski, Paul G., 891
Farquhar, Graham D., 534
Fathi, Marion, 710
Feather, Milton S., 1014
Feenstra, Will J., 234
Ferguson, David L., 740
Fernando, Mala, 1128
Fleet, George, 413
Fock, Heinrich P., 1053
Fondren, W. Mark, 310
Forsythe, Kathlene L., 1014
Foster, Michael A., 816
Fredeen, Arthur L., 29
Fredrikson, Karin, 871
Fritig, Bernard, 520
Fry, Stephen C., 197

G

Gamon, John A., 487
Garello, Ginette, 1164
Gelvin, Stanton B., 281
Gengenbach, Burle G., 1220
Georgii, Hans-Walter, 560
Ghisi, Rosella, 846
Gibbs, Mark J., 37
Glass, Anthony D. M., 1128
Glund, Konrad, 970
Goldstein, Guillermo, 130
Gonneau, Martine, 659
Gonzales, Andrea P., 88
Goren, Raphael, 48, 54
Gowri, G., 1
Goyal, Arun, 621, 630
Gracz, Hanna, 1014
Gradziel, Thomas M., 334
Grantz, David A., 130
Green, Pat D., 262
Greenblatt, Gerald A., 816
Greyson, Maureen F., 155
Gronwald, John W., 467, 1220
Gross, Wiltrud, 41
Grosset, Jean, 520
Guerin, Vincent, 595
Guerrero, Miguel G., 886
Guikema, James A., 262, 648, 654, 740
Guillemaut, Pierre, 136

H

Hadjeb, Nouréddine, 1241
Hammer, Graeme L., 534
Hardegree, Stuart P., 462
Harding, Scott A., 648, 654
Harper, James E., 1142
Hartwig, Ueli A., 116
Hase, Eiji, 802

Haughn, George W., 1081
Haunold, Werner, 560
Hayashida, Nobuaki, 273
Heber, Ulrich, 293, 846
Heim, Dale R., 858
Heinhorst, Sabine, 939
Heisler, L., 912
Heldt, Hans W., 684
Hemmingsen, Sean M., 151
Henderson, Sally A., 534
Henry, Ralph L., 262
Henson, Cynthia A., 614
Herbert, Stephen K., 514
Hertel, Rainer, 792
Hind, Geoffrey, 919
Ho, Tuan-hua David, 1133
Holt, Jodie S., 954
Hoober, J. Kenneth, 419
Horwitz, Benjamin A., 1004
Hotary, Kevin B., 543
Huang, Laiqiang, 172
Huang, Tan-Chi, 531
Huber, Beate, 560
Hubick, Kerry T., 534
Hunt, Stephen, 1101

I

Iglesias, Alberto A., 66

J

Jackson, William A., 286
Jacobsen, Evert, 234
Jäger, Renate, 123
James, Alan T., 265
Jarvis, Michael C., 61
Jayabaskaran, Chelliah, 136
Johnson, Ellen M., 254
Jones, Russell L., 506
Joosten, Matthieu H. A. J., 1108
Jordan, Ramon L., 395
Jorrin, Jesus, 447
Joseph, Cecillia M., 116, 983
Jost, Wolfgang, 970

K

Kaiser, Georg, 123
Kaladharan, P., 408
Kapulnik, Yoram, 983
Kauffmann, Serge, 520
Kaufman, Lon S., 495
Keith, Robin A., 1220
Ken-Dror, Shifra, 1004
Keppler, L. Dale, 215
Kernan, Andrea, 500
Keyes, Geoff, 242
Kidambi, Saranga P., 363, 1211
Kieliszewski, Marcia J., 316, 327
Klimczak, Leszek J., 919
Knowles, Vicki L., 155
Koch, James L., 642
Kolattukudy, Pappachan E., 276
Kondo, Noriaki, 147
Krebbers, Enno, 899
Krieg, Daniel R., 1211
Kriz, Alan L., 538
Krüger, Almuth, 293
Kuehn, Glenn D., 88
Kulpa, Jerzy, 1128
Kuntz, Marcel, 136
Kuo, Tsung Min, 990

L

Ladror, Uri S., 850
Lagares, Antonio, 368
Lamport, Derek T. A., 316, 327
Langis, Robert, 666
Larkins, Brian A., 191
Larrigaudière, Christian, 577
Larrinua, Ignacio M., 858
Larsson, Christer, 871
Latché, Alain, 577
Layzell, David B., 1101
Legaz, M. Estrella, 679
Legrand, Michel, 520
Le Page-Degivry, Marie-Thérèse, 1164
Lescure, Jean-Charles, 79
Lew, Roger R., 822, 831
Leykam, Joseph F., 316
Li, Xiong-biao, 327
Li, Yi, 551
Liebl, Rex A., 777
Lindblad, Peter, 809
Livingston, David P., III, 767
Lizotte, Pauline A., 614
Longnecker, Nancy, 17
Loopstra, Carol, 1226
Lopes, Mauricio A., 191
Losada, Manuel, 886
Louie, Donna, 88
Lynes, Michael A., 1205
Lyons, Philip C., 726

M

Maathuis, Frans J. M., 23
Madhavan, S., 816
Mae, Tadahiko, 1215
Mahan, James R., 363
Makino, Amane, 1215
Maloney, Margaret A., 419
Mancinelli, Alberto L., 1191
Manzi, Adriana E., 931
Marchesini, Augusto, 1148
Margosiak, Stephen A., 88
Mariotti, André, 79
Marks, Dawn B., 419
Martin, Barry A., 755, 761
Martin, C., 912
Martin, Luisa, 679
Martin, Michel, 79
Martínez, Maritza, 679
Martinez-Zapater, Jose M., 770
Martinoia, Enrico, 123
Martin-Tanguy, J., 912
Mason, Hugh S., 205
Mason, John G., 37
Matches, Arthur G., 363
Matoh, Tōru, 1169
Matthews, Benjamin F., 395, 587
Maxwell, Carl A., 116
Maxwell, Robert J., 672
McCloskey, William B., 954
Medina, Isabel, 679
Meinzer, Frederick C., 130
Melis, Anastasios, 1196
Meyer, Christian, 659
Meyer, Christopher R., 456
Meyer, Yves, 520
Mikami, Kohki, 273
Milham, Paul J., 977
Mischke, Charles F., 215, 427
Miyadai, Kenji, 1215
Miyata, Kazuya, 963
Mogen, Kim, 1233
Mohan, Royce, 276
Molin, Lisa, 500
Moore, Larry W., 1226
Moore, Randy, 310
Moran, Rami, 1075
Morell, Matthew, 881
Moreno, Joaquin, 703
Morot-Gaudry, Jean-François, 79
Mortain-Bertrand, Anne, 891
Mousseau, Anne, 570
Mullet, John E., 205
Murata, Norio, 1062
Murata, Shinji, 1169

N

Nagahashi, Gerald, 413
Nakamoto, Hitoshi, 963
Namgoong, Sun K., 413
Neale, Patrick J., 1196
Neimanis, Spidola, 293
Neuhaus, H. Ekkehard, 637
Neuman, Dawn S., 1021
Nevins, Donald J., 642
Newman, Lee A., 1241
Nieder, Matthew, 881
Norman, Michael A., 777
Nungesser, Edwin, 672
Nürnberger, Thorsten, 970

O

Oard, James H., 334
Obokata, Junichi, 273
Oelmüller, Rolf, 434
Ogren, William L., 110
Ojima, Kunihiko, 1215
Orlandi, Elizabeth W., 215
Osafune, Tetsuaki, 802
Outlaw, William H., Jr., 528

P

Pace, Gary M., 286
Paige, David F., 334
Paiva, Edilson, 191
Paiva, Renato, 538
Palmer, Gerald R., 1101
Palmgren, Michael Gjedde, 871
Park, Jonathon, 696
Parker, William B., 1220
Paulsen, Gary M., 648, 654, 740
Pauzé, Fernand J., 995
Paynot, M., 912
Pearcy, Robert W., 487
Pech, Jean Claude, 577
Pedrosa, Mercedes M., 679
Pelsy, Frédérique, 659
Peterson, Richard B., 608
Pfanz, Hardy, 560
Phillips, Donald A., 116, 983
Pike, Philip D., 858
Pistocchi, Rossella, 690
Poggenburg, Carola A., 1205
Ponstein, Anne S., 234
Porath, Dan, 1075
Preiss, Jack, 881
Price, Carl A., 1241
Prins, Hidde B., 23
Prioul, Jean-Louis, 79
Pueppke, Steven G., 946
Purcell, Larry C., 268

R

Radin, John W., 855
Rao, I. Madhusudana, 29
Raps, Shirley, 358
Raschke, Klaus, 246
Rathore, Keerti S., 543
Reckmann, Udo, 246
Redinbaugh, Margaret G., 375
Reding, Linda, 755, 761
Reed, Malcolm L., 977
Rennenberg, Heinz, 560
Rigaud, Jean, 595
Riov, Joseph, 48, 54
Rivas, Joaquín, 886
Roberts, Jean L., 858
Robinson, J. Michael, 862
Robinson, Kenneth R., 543
Rodriguez, Carlos W., 679
Rodríguez, Herminia, 886
Roessler, Paul G., 73
Ronquist, Fredrik, 222
Rosenow, Darrell T., 1211
Russell, Douglas A., 401

S

Sabre, Mara, 375
Sachs, Martin M., 401
Saftner, Robert A., 547
Sagee, Oded, 54
Sanchez, Juan, 684
Santakumari, Mane, 733
Sasakawa, Hideo, 963
Scandalios, John G., 375
Schauf, Charles L., 822, 831
Scheibe, Renate, 246
Scherbatskoy, Timothy D., 103
Scheuermann, Ralph, 1053
Schnarrenberger, Claus, 710
Schon, Mary K., 602
Schramel, Peter, 1184
Schreiber, Ulrich, 1184
Schröder, Peter, 560
Schubert, Carol, 672
Schueler, Sherry B., 747
Schumaker, Karen S., 340
Sears, Barbara B., 254
Sederoff, Ronald R., 1226
Sellstedt, Anita, 809
Senger, Horst, 621
Serlin, Bruce S., 822, 831
Servaites, Jerome C., 867
Setter, Tim L., 242
Sharkey, Thomas D., 186
Shelp, Barry J., 797
Short, Timothy W., 179
Siddiqi, M. Yaeesh, 1128
Signer, Ethan R., 1009
Silverman, Daniel S., 1121
Silvester, Warwick B., 480
Simmonds, John A., 334
Sinclair, Thomas R., 268
Singletary, George W., 160
Slocum, Robert D., 1205
Slovik, Stefan, 560
Smit, Barbara A., 1021
Smulders, Marinus J. M., 565, 582
Somers, David A., 1220
Somerville, Christopher R., 770, 1081
Sommarin, Marianne, 871
Sorrells, Mark E., 242
Stabel, Priska, 1174
Stachowiak, Matthew L., 1021
Stahl, Klaus, 560
Steponkus, Peter L., 666
Sterling, Tracy M., 1121
Stewart, Cecil R., 755, 761
Sticher, Liliane, 506
Stitt, Mark, 637
Stockton, Marsha E., 822, 831
Stomp, Anne-Marie, 1226
Strack, Dieter, 41
Streit, Luc, 924
Stuhlfauth, Thomas, 1053
Sugiharto, Bambang, 963
Sugiura, Masahiro, 273
Sugiyama, Tatsuo, 963
Sukenik, Assaf, 891
Sullivan, Joe H., 141
Sumida, Shuji, 802
Summers, Peter S., 881
Sze, Heven, 340

T

Tabor, Christopher A., 103
Talon, Manuel, 1094
Tateno, Masaki, 12
Taylorson, Ray B., 427
Tepfer, D., 912
Teramura, Alan H., 141
Termini, Agostino, 1148
Terry, Norman, 29
Tezuka, Takafumi, 147
Thielmann, Jens, 621
Thimann, Kenneth V., 696
Thomas, Jean-Claude, 570
Thornburg, Robert W., 500
Tissaoui, Tahar, 1029
Tolbert, N. Edward, 621, 630
Trese, Arthur T., 946
Triantaphylidès, Christian, 577
Trinchant, Jean-Charles, 595
Tu, Jenn, 531
Tu, Shu-I, 413, 672
Turano, Frank J., 395, 587
Tyree, Melvin T., 103

V

Vance, Nan C., 1244
Van Damme, Jozef, 899
Vandekerckhove, Joël, 899
Van der Krieken, Wim M., 565, 582
Van Montagu, Marc, 899
VanSumere, Christian F., 1148
Vendewiele, Martine, 899
Venkatachalam, K. V., 816
Vera, Pablo, 227
Vernon, Leo P., 1075
Vicente, Carlos, 679
Visser, Eric J. W., 582
Vivekanandan, M., 408
Vögeli-Lange, Regina, 1086
Volk, Richard J., 286
von Caemmerer, Susanne, 534
Vos-Scheperkeuter, Greetje H., 234

W

Wada, Hajime, 1062
Wade, Len J., 534
Wagner, George J., 1086
Wallace, John C., 191
Wallace, Mark S., 538
Walton, Daniel C., 551
Warpeha, Katherine M. F., 495
Wedding, Randolph T., 456
Weibull, Jens, 222
Weil, Jacques-Henry, 136
Weissbach, Arthur, 939
Welbaum, Gregory E., 1029, 1038, 1046
Welch, Ross M., 17
Whitaker, John R., 381, 386
Widell, Susanne, 871
Widholm, Jack M., 777
Williams, Lorraine E., 747
Williams, Myron N. V., 1009
Williamson, Cynthia L., 1205
Wilson, Barbara J., 587
Winship, Lawrence J., 480
Winter, Klaus, 293, 302, 1184
Wiskich, Joseph T., 265
Witholt, Bernard, 234
Woltering, Ernst J., 837
Wong, Daphne M.-L., 401
Wong, Peter P., 262
Wong, Tuck C., 1014
Wu, Shenchuan, 1142
Wullems, George J., 565, 582
Wyse, Donald L., 1220
Wyss-Benz, Markus, 924

Y

Yamamoto, Yukio, 147
Yang, Limei, 881
Yang, Shang Fa, 48
Yokota, Akiho, 802
Young, Linda M., 792

Z

Zaerr, Joe B., 1244
Zannoni, Davide, 690
Zeevaart, Jan A. D., 1094
Zelitch, Israel, 352
Zielinski, Raymond E., 850
Zocchi, Graziano, 908

Plant Physiol. (1990) 92, xxvii–xxxiv
0032-0889/90/92/xxvii/$01.00/0

Subject Index

A

Abscisic acid
  embryos of maize *viviparous* mutants, globulin gene expression, 538
  endogenous, onset and release of embryo dormancy, sunflower, 1164
  -induced ethylene production, citrus leaf, tomato fruit tissues, 48
  precursor, violaxanthin, water-stressed dark-grown bean leaves, 551
  reduction of leaf growth, root hypoxia, *Populus trichocarpa*, 1021
  seed development and germination, water relations, muskmelon, 1029, 1038
  water deficit and, shoot *vs.* root growth, soybean seedlings, 205
cis, *trans*-abscisic acid, respiration activation, mitochondria, castor bean, 147
Abutilon theophrasti (*see* Velvetleaf)
Acer saccharum (*see* Maple)
acetyl coenzyme a carboxylase
  purification and characterization, *Cyclotella cryptica*, 73
  sethoxydim-tolerant maize tissue cultures, 1220
acetylene, oxygen and, responses of nitrogenase, *Frankia*, 480
Acremonium coenophialum, effects on nitrogen accumulation, metabolism, tall fescue, 726
adenosine triphosphate, -dependent fructose 6-phosphate 1-phosphotransferase, endosperm tissues and leaf, castor bean, 155
ADPglucose pyrophosphate, maize endosperm subunit, molecular characterization, *Brittle-2* gene effect, 881
Agrobacterium rhizogenes, root-inducing, left-hand transferred DNA, polyamine metabolism, 912
Agrobacterium tumefaciens
  crown gall disease and hairy root disease, 281
  extended host range in pine, 1226
Airgun, transient gene expression, maize, rice, and wheat cells, 334
Alanine, uptake, barley mesophyll protoplasts, 123
Albumin, *Arabidopsis*, expression and processing, transgenic tobacco, 899
Alfalfa
  feedback regulation of nodule formation, *Rhizobium meliloti* exopolysaccharide mutants, 368
  rubisco as substrate for transglutaminase, 88
  seed, flavonoids, induction of rhizobial *nod* genes, 116
  stress responses, 440, 447
  thermal dependence of glutathione reductase, 363
Algae
  blue-green, calcium requirement, aerobic nitrogen fixation, 886
  Chlamydomonas reinhardtii, chlorophyll *a*/*b*-binding polypeptides, 419
  green, codon usage, 1
  Porphyra perforata, photoinhibition resistance, 514
  Porphyra umbilicalis, phycobilisome heterogeneity, 570
  salicylhydroxamic acid inhibition, inorganic carbon concentration, 630
  Scenedesmus, concentration of CO_2 and bicarbonate, photosynthesis, 622
Amino acids
  composition of leaf exudates and phloem sap, barley and oat, 222
  differential regulation of homoserine dehydrogenase, maize, 785
  transport across the vacuole tonoplasts, barley mesophyll protoplasts, 123
Aminoacyl-tRNA synthetases, chloroplast tRNas in senescing bean leaves, 136
1-Aminocyclopropane-1-carboxylic acid
  ethylene and, interorgan translocation, *Cymbidium* flowers, 837
  γ-irradiation effects on metabolism, cherry tomatoes, 577
5-Aminolevulinic acid, regulation of synthesis, developing chloroplasts, cucumber, 172
α-Amylase
  characterization, shoots and cotyledons, pea seedlings, 1154
  inhibition of synthesis by heat shock, barley aleurone, 506
  inhibitor, bean seeds, 703
  mRNa, heat shock proteins, heat-stressed barley aleurone cells, 1133
β-Amylase, pea epicotyl, purification, characterization, 615
Anabaena, aerobic nitrogen fixation, calcium requirement, 886
Anoxia, anaerobic response of soybean, 401
Anthocyanin, photoregulation of production, light quality and quantity, cabbage and tomato, 1191
Antibiotics, senescence and stomatal aperture, darkness and light, barley, 696
Apium graveolens (*see* Celery)
Arabidopsis thaliana
  Csr1 locus, imidazolinone resistance, 1081
  late-flowering mutants, light quality, vernalization, 770
  2S albumin expression and processing, transgenic tobacco, 899
  second locus *lxr* B1, resistance, herbicide isoxaben, 858
Asparagus, detection of kestoses and kestose-related oligosaccharides, NMR spectroscopy, 1014
Aspartate aminotransferase, purification and characterization of isoenzymes, carrot suspension cultures, 587
Assays, enzyme, metal-ligand interactions, phospho*enol*pyruvate carboxylase, 528
Auxin, movement, gravitropism, corn roots, 792
Avena sativa (*see* Oat)

B

Bacteroids, broad bean, nitrogen fixation, water-restricted conditions, 595
Barley
  aleurone cells
    heat shock proteins, α-amylase mRNa, 1133
    inhibition of α-amylase synthesis, heat shock, 506
  leaf exudates and phloem sap, free amino acid composition, 222
  mesophyll protoplasts, vacuole tonoplasts, amino acid transport, 123
  oat and, fructan precipitation, water/ethanol extract, 767
  root, potassium-dependent changes, membrane-associated proteins, 1128
  senescence and stomatal aperture, antibiotics, darkness and light, 696
  soluble and membrane-bound calcium-dependent protein kinases, 919
  subcellular compartmentation of uridine nucleotides, nucleoside-5′-diphosphate kinase, 637
Bean
  binding of lectin to rhizobia, reduced gravity, 262
  immunological characterization, ornithine transcarbamylases, 1205
  seed, α-amylase inhibitor, 703
  senescing leaves, chloroplast tRNas, aminoacyl-tRNa synthetases, 136
  water-stressed dark-grown leaves, violaxanthin, abscisic acid precursor, 551
Beet
  carbon partitioning, leaf phosphate status, photosynthesis, 29
  chenopod extensin, lack of repetitive tetrahydroxyproline blocks, 327
  plasma membrane Ca^{2+}-aTPase, GTP as alternative substrate, 747
  sealed inside-out and right-side-out plasma membrane vesicles, 871
Bentazon, uptake and accumulation, soybean, velvetleaf, 1121
Beta vulgaris (*see* Beet)
Bicarbonate, concentration of, photosynthesis, *Scenedesmus*, 622
Boron, foliar applications, soybean branches and pods on branches, 602
Broad bean
  inhibition of loading of C-14 assimilates, *p*-chloromercuribenzenesulfonic acid, 97
  nodules and bacteroids, nitrogen fixation, water-restricted conditions, 595

C

Cabbage, light quality and quantity, photoregulation, anthocyanin production, 1191
Cadmium, cadmium-binding peptides and, subcellular localization, tobacco leaves, 1086
Caffeoylputrescine, feruloylputrescine and, growth and floral bud formation, tobacco, 924

Calcium
-activated potassium channels, red light, *Mougeotia* plasma membrane, 822
activation of *Mougeotia* potassium channels, 831
-aTPase, GTP as alternative substrate, red beet plasma membrane, 747
calmodulin effect and, pH formation, corn roots, 850
-dependent protein kinases, soluble and membrane-bound, barley, 919
influx in bacterial induction, plasma membrane, tobacco, 215
requirement for aerobic nitrogen fixation, heterocystous blue-green algae, 886
-stimulated phospholipase D, subcellular localization, maize roots, 672
Calmodulin, calcium and, pH formation, corn roots, 850
Capsicum annuum (*see* Pepper)
Capsicum frutescens, cell walls, solubilization, covalently bound extensin, 197
Carbohydrates, cell wall, endosperm of seed, *Gleditsia triacanthos*, 931
Carbon
-assimilating enzymes, regulation by nitrogen, maize leaf, 963
concentrating process, salicylhydroxamic acid inhibition, unicellular green algae, 630
isotope discrimination
genetic variation, C_4 species, 534
limited water supply, coffee genotypes, 130
nitrogen allocation and, stalk elongation, corn, 79
partitioning and leaf phosphate status, photosynthesis, sugar beet, 29
Carbon-14 assimilates, inhibition of loading, *p*-chloromercuribenzenesulfonic acid, 97
Carbon dioxide
concentration of, photosynthesis, *Scenedesmus*, 622
-enriched pine species, increases, phosphorus requirements, 977
-limited photosynthesis, nitrate reduction, corn, 286
Carbonic anhydrase, chloroplastic, spinach, 37
2-Carboxyarabinitol-1-phosphate, inhibition of ribulose 1,5-bisphosphate carboxylase/oxygenase, 867
Carob, direct observation of cell wall structure, solid state C-13 NMR spectroscopy, 61
Carotenoid, -binding protein in chromoplasts, pepper, 1241
Carrot
aspartate aminotransferase isoenzymes, purification, characterization, 587
immunological characterization, homoserine dehydrogenase, 395
Castor bean
activation of respiration, NaD-specific isocitrate dehydrogenase, mitochondria, 147
developing endosperm, protein import into plastids, energy requirement, 151
endosperm tissues and leaf, fructose 6-phosphate 1-phosphotransferase isozymes, 155
Catalase
distribution of activity, isozyme protein, developing maize seedling, 375
O_2-resistant photosynthesis and photorespiration, catalase activity, tobacco mutant, 352
Celery, direct observation of cell wall structure, solid state C-13 NMR spectroscopy, 61
Cell wall
-associated enzymes, sugar analogs, corn, 413
Capsicum frutescens, solubilization, covalently bound extensin, 197
carbohydrates, endosperm of seed, *Gleditsia triacanthos*, 931
direct observation of structure, solid state C-13 NMR spectroscopy, living plant tissues, 61
gold cytochemistry of pectic components, cell surface interactions, tomato root, 995
regulation of extensibility, gibberellic acid, wheat, 242
tomato fruit, 642
Ceratonia siliqua (*see* Carob)
Chilling, corn genotypes, seedling growth, mitochondrial chracteristics, 761
Chitinases
subcellular localization, *Fusarium oxysporum*, tomato root tissues, 1108
tobacco mesophyll protoplasts, 520
Chlamydomonas reinhardtii
accumulation, chlorophyll *a*/*b*-binding polypeptides, 419
activation of reserve pool, photosystem II, 1196
salicylhydroxamic acid inhibition, dissolved inorganic carbon concentrating process, 630
Chloramphenicol, accumulation of light-harvesting chlorophyll *a*/*b* protein II, mutant wheat, 1233
Chloramphenicol acetyl transferase, protein expression, attack by insects, transgenic tobacco, 500
Chlorogenic acid:glucaric acid caffeoyltransferase, properties and activity changes, tomato, 41
p-Chloromercuribenzenesulfonic acid, inhibition of loading of C-14 assimilates, 97
Chlorophyll
developmental stages of cucumber seedlings, 1075
fluorescence and photosynthesis, leaf pigment and element composition, *Platanus occidentalis*, 1184
quenching of fluorescence, zeaxanthin, spinach leaves, 302
Chlorophyll *a*/*b*, -binding polypeptides, accumulation, *Chlamydomonas reinhardtii*, 419
Chloroplasts
cucumber, regulation, 5-aminolevulinic acid synthesis, 172
differential regulation of homoserine dehydrogenase, maize, 785
DNa polymerase, cultured soybean cells, 939
mechanically isolated from wheat leaves, ribulose-1,5-bisphosphate carboxylase/oxygenase degradation, lysates, 1215
oxidation *vs.* reductive detoxification of SO_2, spinach, 846
spinach
carbonic anhydrase, 37
inhibition of zeaxanthin formation, dithiothreitol, 293
triazine resistance in *Senecio vulgaris*, 954
tRNas in senescing bean leaves, aminoacyl-tRNa synthetases, 136
Chromoplasts, carotenoid-binding protein of pepper, 1241
Circadian rhythm, prokaryote *Synechococcus*, 531
Citrus
leaf
abscisic acid-induced ethylene production, 48
ethylene, indole-3-acetic acid catabolism, 54
Citrus aurantifolia (*see* Lime)
Citrus aurantium (*see* Orange)
Clomazone, metabolism, soybean and cotton cell suspensions, 777
Codon, usage in higher plants, green algae, cyanobacteria, 1
Coffee, genotypes, carbon isotope discrimination, limited water supply, 130
Cold, tolerance, seedling chilling responses, corn genotypes, 761
Corn
anaerobic response to soybean, 401
developing kernels, nitrogen-induced changes, growth and metabolism, 160
developing seedling, catalase activity, isozyme protein, 375
endosperm aDPglucose pyrophosphorylase subunit, molecular characterization, *Brittle-2* gene effect, 881
genotypes, seedling chilling responses, 761
gravitropic curvature of primary roots, 310
gravistimulated roots, 792
homoserine dehydrogenase, differential regulation, 785
immunological characterization, ornithine transcarbamylases, 1205
inhibition of cell wall-associated enzymes, sugar analogs, 413
leaf, carbon-assimilating enzymes, nitrogen regulation, 963
microspores, developmental staging, transition in proteins, 474
modified *opaque*-2, extraction and quantitation, zeins, 191
nitrate reduction, carbon dioxide-limited photosynthesis, 286
root
calcium and calmodulin effect, pH formation, 850
subcellular localization, calcium-stimulated phospholipase D, 672
seedling, respiration and alternative oxidase, germination, 755
sethoxydim-tolerant, tissue cultures, 1220
stalk elongation, estimation, carbon and nitrogen allocation, 79
starch-deficient endosperm mutants, sugar metabolism, developing kernels, 990
structure of threonin-rich extensin, 316
transient gene expression, airgun apparatus, 334
viviparous mutants, embryos, globulin gene expression, 538
Cotton
seedling, transpiration and hydraulic conductance, root temperature, 855
soybean and, clomazone metabolism, 777
Cotyledons
pea seedling, characterization, α-amylase,

1154
squash, intact plastids for nitrate reductase activity, mRNa accumulation, 434
Cowpea, initiation and early growth of nodules, host gene expression, 946
C_4 plants, genetic variation, carbon isotope discrimination, 534
Crassulacean acid metabolism, NaDP-dependent malic enzymes from leaves, 710
Crown gall disease, hairy root disease and, 281
Cryopreservation, vitrification, rye protoplasts, 666
Cucumber
developing chloroplasts, regulation, 5-aminolevulinic acid synthesis, 172
root, iron uptake mechanism, 908
seedlings, developmental stages, 1075
Cucumis melo (*see* Muskmelon)
Cucumis sativus (*see* Cucumber)
Cucurbita maxima (*see* Squash)
Cucurbita pepo (*see* Zucchini)
Cyamopsis tetragonoloba, chloroembryos, photosynthetic potential, accumulation of assimilates, 408
Cyanobacteria
codon usage, 1
temperature-induced changes, fatty acid composition, 1062
Cyclotella cryptica, purification and characterization, acetyl-Coa carboxylase, 73
Cymbidium, flowers, interorgan translocation, 1-aminocyclopropane-1-carboxylic acid and ethylene, 837
Cytochemistry, gold, pectic components in cell surface interactions, tomato root, 995
Cytokinins
flower bud formation, tobacco, 565
-induced adventitious bud formation, protein synthesis changes, Norway spruce, 1174

D

Dactylis glomerata, detection of kestoses and kestose-related oligosaccharides, NMR spectroscopy, 1014
Darkness, senescence and stomatal aperture, antibiotics, barley, 696
Deoxyribonucleic acid
complementary, spinach chloroplastic carbonic anhydrase, 37
left-hand transferred, polyamine metabolism, *Agrobacterium rhizogenes*, 912
Deoxyribonucleic acid polymerase, chloroplast and mitochondrial, cultured soybean cells, 939
Digitalis lanata, light energy dissipation, water stress conditions, 1053
Dithiothreitol, inhibition of zeaxanthin formation, spinach leaves and chloroplasts, 293
Dormancy
composition and synthesis of proteins, cellular membranes, *Echinochloa crus-galli*, 427
sunflower embryo, endogenous abscisic acid, 1164
Drought, *see also* Water stress
interaction with solar ultraviolet-B radiation, photosynthesis and growth, soybean, 141
Dunaliella tertiolecta
adaptation of photosynthetic apparatus, irradiance, 891
salicylhydroxamic acid inhibition, dissolved inorganic carbon concentrating process, 630

E

Echinochloa crus-galli, composition and synthesis of proteins, cellular membranes, dormancy to germination, 427
Endoplasmic reticulum
delamellation, heat shock proteins, heat-stressed barley aleurone cells, 1133
inhibition of α-amylase synthesis, heat shock, barley aleurone, 506
Endosperm
castor bean
fructose 6-phosphate 1-phosphotransferase isozymes, 155
protein import into plastids, energy requirement, 151
Enzymes, developmental regulation, sucrose and hexose metabolism, soybean nodules, 346
Epicotyl
elongation in pea, blue-light responses, 495
pea, β-amylase, characterization, 615
Ethephon, effect on protein degradation, tomato leaf discs, 227
Ethylene
abscisic acid-induced production, citrus leaf, tomato fruit tissues, 48
1-aminocyclopropane-1-carboxylic acid and, interorgan translocation, *Cymbidium* flowers, 837
indole-3-acetic acid catabolism, citrus leaf, 54
polyamine levels, tomato fruit development, 547
Eucalyptus gunnii, adventitious root formation, flavonoid accumulation, 1148
Euglena gracilis, localization of ribulose-1,5-bisphosphate carboxylase, pyrenoid morphology, chloroplasts, 802
Extensin
chenopod, lack of repetitive tetrahydroxyproline blocks, 327
covalently bound, solubilization, *Capsicum* cell walls, 197
threonin-rich, structure, corn, 316

F

Fatty acid, temperature-induced changes in composition, cyanobacterium, 1062
Fenugreek, direct observation of cell wall structure, solid state C-13 NMR spectroscopy, 61
Feruloylputrescine, caffeoylputrescine and, growth and floral bud formation, tobacco, 924
Fescue, effects of *Acremonium coenophialum*, nitrogen accumulation and metabolism, 726
Festuca arundinacea, detection of kestoses and kestose-related oligosaccharides, NMR spectroscopy, 1014
Filter paper, solution-saturated, water potential, polyethylene glycol exclusion, 462
Flaveria linearis, photosynthesis, inheritance, reversal of oxygen response, 186
Flavonoids
accumulation, adventitious roots, *Eucalyptus gunnii* hook, 1148
induction of rhizobial *nod* genes, alfalfa seed, 116
Flower
bud formation in tobacco, cytokinins, 565
bud regeneration in pedicel explants, developmental state of tissue, tobacco, 582
buds of forsythia, formation and distribution of ice, 718
Cymbidium, interorgan translocation, 1-aminocyclopropane-1-carboxylic acid and ethylene, 837
growth and floral bud formation, feruloylputrescine and caffeoylputrescine, tobacco, 924
late mutants of *Arabidopsis thaliana*, light quality, vernalization, 770
Fluorescence
chlorophyll
leaf pigment and element composition, *Platanus occidentalis*, 1184
zeaxanthin, spinach leaves, 302
phycobiliprotein and linker polypeptides, *Microcystis aeruginosa*, 358
water vapor pressure deficit, photochemical yields, tobacco leaf tissue, 608
Forsythia, flower buds, formation and distribution of ice, 718
Frankia
actinorhizal nodules, responses of nitrogenase, acetylene and oxygen, 480
free-living and symbiotic, localization of hydrogenase, 809
Fructan, precipitation from water/ethanol extract, oats and barley, 767
Fructanase, hydrolization of natural polysaccharides, sugarcane, 679
Fructose 6-phosphate 1-phosphotransferase, aTP-dependent isozymes, endosperm tissues and leaf, castor bean, 155
Fruit, set, peptidase activity, pea ovaries, 1070
Fusarium oxysporum
gold cytochemistry of pectic components, cell surface interactions, tomato root, 995
tomato root tissues, subcellular localization, chitinase, 1108

G

Genes
Brittle-2, maize endosperm aDPglucose pyrophosphate subunit, 881
Csr1 locus of *Arabidopsis thaliana*, imidazolinone resistance, 1081
expression in host, initiation and early growth of nodules, cowpea, 946
nod, flavonoids, alfalfa seed, 116
transient expression, airgun appartus, maize, rice, and wheat, 334
variation in gas exchange rates, grain sorghum, 1211
Germination
composition and synthesis of proteins, cellular membranes, *Echinochloa crus-galli*, 427
respiration and alternative oxidase, different tissues, corn seedling tissues, 755
seed development and, water relations, muskmelon, 1029, 1038, 1046
Gibberellic acid
changes in level of peptidase activities, senescence and fruit set, pea ovaries, 1070
regulation of cell wall extensibility, wheat, 242

Gibberellins, stem growth and, relation to photoperiod, *Silene armeria*, 1094
Gleditsia triacanthos, endosperm of seed, cell wall carbohydrates, 931
Globulin, gene expression, embryos, maize *viviparous* mutants, 538
Glucan, pea epicotyl β-amylase, purification, characterization, 615
1,3-β-Glucanase, tobacco mesophyll protoplasts, 520
Glutamine, uptake, barley mesophyll protoplasts, 123
Glutathione reductase, thermal dependence, two forage legume species, 363
Glutathione *S*-transferase, induction of isozymes, herbicide antidotes, sorghum, 467
Glycine max (*see* Soybean)
Gold, cytochemistry, pectic components in cell surface interactions, tomato root, 995
Grape, wild, photoinhibition, 487
Gravitropism
  corn root, auxin movement, 792
  curvature of primary roots from corn, 310
Gravity, reduced, lectin binding to rhizobia, bean, 262
Greening, altered phytochrome regulation, *aurea* mutant, tomato, 1004
Guanosine triphosphate, alternative substrate, red beet plasma membrane Ca^{2+}-aTPase, 747
Guard cells, pea, rubisco activity, 246

H

Hairy root disease, crown gall disease, 281
H^+/Ca^{2+} exchanger, oat root, solubilization, reconstitution, 340
Heat shock proteins
  degradation of α-amylase mRNA, heat-stressed barley aleurone cells, 1133
  inhibition of α-amylase synthesis, barley aleurone, 506
Helianthus annuus (*see* Sunflower)
Helianthus tuberosus, spermidine uptake by mitochondria, 690
Herbicide, antidotes, glutathione *S*-transferase isozymes, sorghum, 467
Hexose, regulation of enzymes of metabolism, effective and ineffective nodules, soybean, 346
Homoserine dehydrogenase
  differential regulation in maize, 785
  immunological characterization, carrot suspension cultures, 395
Hordeum vulgare (*see* Barley)
Hydrogenase
  development and partial characterization, nearly isogenic pea lines, 983
  localization, free-living and symbiotic *Frankia*, 809
Hypoxia, root, reduction of leaf growth, *Populus trichocarpa*, 1021

I

Ice, formation and distribution, forsythia flower buds, 718
Imbibition, seed development and germination, water relations, muskmelon, 1046
Imidazolinone, resistance, *Csr1* locus, *Arabidopsis thaliana*, 1081
Indole-3-acetic acid, ethylene-enhanced catabolism, citrus leaf, 54
Invertase, potato, inhibition, endogenous proteinaceous inhibitor, 381, 386
Ionic current, radish lateral roots, two-dimensional vibrating probe study, 543
Iron
  apoplastic, soybean accumulation, 17
  uptake mechanism, iron-efficient cucumber roots, 908
Irradiance, adaptation of photosynthetic apparatus, *Dunaliella tertiolecta*, 891
γ-Irradiation, 1-aminocyclopropane-1-carboxylic acid metabolism, cherry tomatoes, 577
Isocitrate dehydrogenase, NaD-specific, respiration activation in mitochondria, castor bean, 147
Isoxaben, resistance, locus *lxr* B1, *Arabidopsis thaliana*, 858
Isozymes
  glutathione *S*-transferase, herbicide antidotes, sorghum, 467
  protein, catalase activity, developing maize seedling, 375

K

Kestoses, kestose-related oligosaccharides and, NMR spectroscopy, *Festuca arundinacea*, *Dactylis glomerata*, and asparagus, 1014

L

Leaf
  barley, compartmentation, uridine nucleotides, 637
  barley and oat exudates, free amino acid composition, 222
  bean
    senescence, chloroplast tRNAs, 136
    violaxanthin, abscisic acid precursor, 551
  castor bean, fructose 6-phosphate 1-phosphotransferase isozymes, 155
  citrus
    abscisic acid-induced ethylene production, 48
    ethylene, indole-3-acetic acid catabolism, 54
  corn, carbon-assimilating enzymes, nitrogen regulation, 963
  crassulacean acid metabolism plants, NaDP-dependent malic enzymes from leaves, 710
  cuticles of orange and maple, behavior as asymmetric membranes, 103
  Cyamopsis tetragonoloba, photosynthetic potential, assimilate accumulation, 408
  phosphate status in sugar beet, carbon partitioning, sugar beet, 29
  Platanus occidentalis, photosynthesis, chlorophyll fluorescence, 1184
  Populus trichocarpa, reduction of leaf growth, root hypoxia, 1021
  spinach
    compartmentation, uridine nucleotides, 637
    inhibition of zeaxanthin formation, dithiothreitol, 293
    quenching of chlorophyll fluorescence, zeaxanthin, 302
  sugarcane, kinetic and structural properties, NaDP-malic enzyme, 66
  tobacco, subcellular localization, cadmium and cadmium-binding properties, 1086
  tomato, ethephon effect on protein degradation, 227
  Vicia faba, apoplastic loading, 97
  wheat, rubisco degradation by lysates, 1215
Lectin
  binding to rhizobia, reduced gravity, bean, 262
  gold cytochemistry of pectic components, cell surface interactions, tomato root, 995
  -like protein, α-amylase inhibitor, barley seeds, 703
Leucine, uptake, barley mesophyll protoplasts, 123
Ligand, -metal interactions, enzyme assays, phospho*enol*pyruvate carboxylase, 528
Light
  activation of ribulosebisphosphate carboxylase/oxygenase, spinach, 110
  blue
    epicotyl elongation, pea, 495
    protein phosphorylation, pea seedlings, 179
  energy dissipation, water stress conditions, *Digitalis lanata*, 1053
  -induced accumulation of mRNa, intact plastids for nitrate reductase activity, squash, 434
  photoinhibition in wild grape, 487
  quality and quantity, photoregulation, anthocyanin production in cabbage and tomato, 1191
  red, calcium-activated potassium channels, *Mougeotia* plasma membrane, 822
  senescence and stomatal aperture, antibiotics, barley, 696
  vernalization, late-flowering mutants, *Arabidopsis thaliana*, 770
Light-harvesting chlorophyll *a*/*b* protein II, stimulation of accumulation by chloramphenicol, mutant wheat, 1233
Lime, sucrose breakdown systems, 168
Linker polypeptides, phycobiliprotein and, fluorescence, *Microcystis aeruginosa*, 358
Locus, *lxr* B1, isoxaben resistance, *Arabidopsis thaliana*, 858
Lodging, safety factor, succinic acid 2,2-dimethylhydrazide, mulberry tree shoots, 12
Lupin, direct observation of cell wall structure, solid state C-13 NMR spectroscopy, 61
Lycopersicon esculentum (*see* Tomato)
Lycopersicon pimpinellifolium (*see* Tomato, cherry)
Lysates, degradation of ribulose-1,5-bisphosphate carboxylase/oxygenase, mechanically isolated chloroplasts, wheat leaves, 1215

M

Maize (*see* Corn)
Malate, inhibition of phospho*enol*pyruvate carboxylase, 456
Malic enzymes, NaDP-dependent, crassulacean acid metabolism plants, 710
Maple, leaf cuticles, behavior as asymmetric membranes, 103
Medicago sativa (*see* alfalfa)
Metal, -ligand interactions, enzyme assays, phospho*enol*pyruvate carboxylase, 528

Michaelis-Menten, squared function of substrate concentration, plant mitochondrial respiration, 265
Microcystis aeruginosa, phycobiliprotein and colorless linker polypeptides, fluorescence, zinc sulfate, 358
Microspores, corn, developmental staging, transition in proteins, 474
Mitochondria
DNa polymerase, cultured soybean cells, 939
respiration, substrate concentration, squared Michaelis-Menten function, 265
respiration activation, NaD-specific isocitrate dehydrogenase, castor bean, 147
seedling chilling responses, corn genotypes, 761
spermidine uptake, *Helianthus tuberosus*, 690
Morus bombycis (*see* Mulberry)
Mougeotia
plasma membrane, calcium-activated potassium channels, red light, 822
potassium channels, calcium activation, 831
Mulberry, shoots, lodging safety factor, succinic acid 2,2-dimethylhydrazide, 12
Muskmelon, seed development and germination, water relations, 1029, 1038, 1046

N

NaDP, -dependent malic enzymes from leaves, crassulacean acid metabolism plants, 710
NaDP-malic enzyme, kinetic and structural properties, sugarcane leaf, 66
Nasturtium, direct observation of cell wall structure, solid state C-13 NMR spectroscopy, 61
Nicotiana (*see* Tobacco)
Nitrate
nitrogen fixation of nodulation mutants, soybean, 1142
reduction, carbon dioxide-limited photosynthesis, corn, 286
Nitrate reductase
deficient mutants of tobacco, 659
intact plastids, mRNa accumulation, squash, 434
regulation in spinach, 684
Nitrite, photoreduction inhibited by oxygen, soybean and spinach, 862
Nitrogen
accumulation, *Acremonium coenophialum* effects, tall fescue, 726
carbon allocation and, stalk elongation, corn, 79
-deficient cotton seedlings, transpiration, hydraulic conductance, 855
fixation, water-restricted conditions, broad bean nodules and bacteroids, 595
fixation in heterocystoid blue-green algae, calcium requirement, 886
fixation of nodulation mutants of soybean, nitrate, 1142
-induced changes in growth and metabolism, developing maize kernels, 160
organic, xylem-to-phloem transfer, young soybean plants, 797
regulation of carbon-assimilating enzymes, 963
Nitrogenase
mechanism of inhibition, soybean nodules, 1101
nodule gas permeability response, rhizospheric NH_3, soybean, 268
transient responses to acetylene and oxygen, *Frankia*, 480
Nodule
actinorhizal, nitrogenase responses, *Frankia*, 480
alfalfa, *Rhizobium meliloti* exopolysaccharide mutants, 368
broad bean, nitrogen fixation, water-restricted conditions, 595
initiation and early growth in cowpea, host gene expression, 946
Nuclear magnetic resonance spectroscopy
detection of kestoses and kestose-related oligosaccharides, *Festuca arundinacea*, *Dactylis glomerata*, and asparagus, 1014
direct observation of cell wall structure, living plant tissues, 61
Nucleoside-5′-diphosphate kinase, compartmentation of uridine nucleotides, barley and spinach leaves, 637

O

Oat
barley and, fructan precipitation, water/ethanol extract, 767
immunological characterization, ornithine transcarbamylases, 1205
leaf exudates and phloem sap, free amino acid composition, 222
root vacuolar H^+/Ca^{2+} exchanger, solubilization, reconstitution, 340
Oenothera hookeri, mutant plastids, activity and composition, 254
Oligosaccharides, kestose-related, detection by NMR spectroscopy, *Festuca arundinacea*, *Dactylis glomerata* and asparagus, 1014
Onobrychis vicifolia (*see* Sainfoin)
Orange, leaf cuticles, behavior as asymmetric membranes, 103
Ornithine transcarbamylases, immunological characterization, various plants, 1205
Osmotins, tobacco mesophyll protoplasts, 520
Oxidase, alternative, respiration, germination in corn seedling tissues, 755
Oxygen
acetylene and, responses of nitrogenase, *Frankia*, 480
inhibition of nitrite photoreduction, soybean and spinach, 862
mechanism of nitrogenase inhibition, soybean nodules, 1101
-resistant photosynthesis and photorespiration, catalase activity, tobacco mutant, 352
reversal of response of photosynthesis, inheritance, *Flaveria linearis*, 186

P

Panicum coloratum, sodium-stimulated growth, enhanced photosynthesis, 1169
Parthenium argentatum, enzymatic synthesis of rubber polymer, 816
Patch clamp, root cell vacuoles of *Plantago* species, salt tolerance and sensitivity, 23
Pea
blue light-mediated protein phosphorylation, 179
epicotyl β-amylase, purification, characterization, 615
epicotyl elongation, blue-light responses, 495
immunological characterization, ornithine transcarbamylases, 1205
nearly isogenic, development, partial characterization, 983
ovaries, peptidase activity, senescence and fruit set, 1070
rubisco in guard cells, 246
seedling shoots and cotyledons, characterization, α-amylase, 1154
Pedicel, explants of tobacco, flower bud regeneration, developmental state of tissue, 582
Pepper, chromoplast-specific protein, carotenoid-binding protein, 1241
Peptidase, activity during senescence and fruit set, gibberellic acid, pea ovaries, 1070
Perisperm, seed development and germination, water relations, muskmelon, 1038
Peroxidase, anionic, gene expression, fungal resistance in tomato, 276
pH
formation, calcium and calmodulin effect, corn roots, 850
inhibition of potato invertase, proteinaceous inhibitor, 381
Phaseolus vulgaris (*see* Bean)
Phenylalanine ammonia-lyase, isoforms, stress responses, alfalfa, 447
Phenylpropanoid, biosynthesis, stress responses, alfalfa, 440
Phloem, transfer of organic nitrogen, young soybean plants, 797
Phosphate, starvation, induction of extracellular ribonuclease, tomato, 970
Phospho*enol*pyruvate carboxylase
inhibition by malate, 456
metal-ligand interactions, enzyme assays, 528
Phospholipase D, calcium-stimulated, subcellular localization, maize roots, 672
Phosphorus
-deficient cotton seedlings, transpiration, hydraulic conductance, 855
requirements, CO_2-enriched pine species, 977
Photoinhibition
resistance, *Porphyra perforata*, 514
wild grape, 487
Photoperiod, gibberellins and stem growth, *Silene armeria*, 1094
Photosynthesis
adaptation to irradiance, *Dunaliella tertiolecta*, 891
carbon dioxide-limited, nitrate reduction, corn, 286
chlorophyll fluorescence and, leaf pigment and element composition, *Platanus occidentalis*, 1184
decline from high temperature stress, maturation, wheat, 648, 654
inheritance of reversal of oxygen response, *Flaveria linearis*, 186
leaf phosphate status and carbon partitioning, sugar beet, 29
maintenance, low water potentials, droughted wheat, 733
O_2-resistant, catalase activity, tobacco mutant, 352

potential and accumulation of assimilates, developing chloroembryos, *Cyamopsis tetragonoloba*, 408
sodium-stimulated growth, *Panicum coloratum*, 1169
soybean, solar ultraviolet-B radiation, drought, 141
systems for concentrating CO_2 and bicarbonate, *Scenedesmus*, 622
water vapor pressure deficit, fluorescence, tobacco leaf tissue, 608
Photosystem I, polymorphism of subunit, alloploidy, tobacco, 273
Photosystem II, activation of reserve pool, counteraction to photoinhibition, *Chlamydomonas reinhardtii*, 1196
Phycobiliprotein, colorless linker polypeptides and, fluorescence, *Microcystis aeruginosa*, 358
Phycobilisome, heterogeneity, *Porphyra umbilicalis*, 570
Phytochrome, altered regulation of greening, *aurea* mutant, tomato, 1004
Picea abies (*see* Spruce)
Pine
CO_2-enriched, increases, phosphorus requirements, 977
extended host range, *Agrobacterium tumefaciens*, 1226
needles, protein differences, prolonged drought, 1244
Pisum sativum (*see* Pea)
Plantago maritima, salt-tolerant and salt-sensitive species, patch clamp studies, root cell vacuoles, 23
Plasma membrane
blue light-mediated protein phosphorylation, pea seedlings, 179
calcium influx in bacterial induction, K^+/H^+ and hypersensitive responses, tobacco, 215
Mougeotia, calcium-activated potassium channels, red light, 822
red beet Ca^{2+}-aTPase, GTP as alternative substrate, 747
vesicles, sealed inside-out and right-side-out, beet, 871
Plastids
intact, nitrate reductase activity, squash, 434
mutant *Oenothera hookeri*, activity and composition, 254
protein import, energy requirement, castor bean endosperm, 151
Platanus occidentalis, leaf pigment and element composition, photosynthesis, chlorophyll fluorescence, 1184
Polyamine
levels, interaction with ethylene, tomato fruit development, 547
metabolism, left-hand transferred DNa, *Agrobacterium rhizogenes*, 912
Polyethylene glycol, exclusion, water potential, solution-saturated filter paper, 462
Polygalacturonic acid, gold cytochemistry of pectic components, cell surface interactions, tomato root, 995
Polypeptides, linker, phycobiliprotein, *Microcystis aeruginosa*, 358
Polysaccharides, natural, hydrolization by fructanase, sugarcane, 679
Polyuronide, metabolism, tomato fruit cell wall, 642
Populus trichocarpa, reduction of leaf growth, root hypoxia, 1021
Porphyra perforata, photoinhibition resistance, 514
Porphyra umbilicalis, phycobilisome heterogeneity, 570
Potassium, -dependent changes, membrane-associated proteins, barley roots, 1128
Potassium channel
calcium-activated
Mougeotia, 831
red light, *Mougeotia* plasma membrane, 822
Potato
inhibition of invertase, endogenous proteinaceous inhibitor, 381
purification and partial characterization of invertase, proteinaceous inhibitor, 386
starch synthesizing enzymes, 234
Protein
blue light-mediated phosphorylation, pea seedlings, 179
degradation, high temperature stress, wheat roots, 740
differences in needles, shaded and unshaded pine, prolonged drought, 1244
membrane-associated, potassium-dependent changes, barley roots, 1128
microspore, developmental staging, corn, 474
pathogenesis-related, accumulation, ethephon effect in tomato leaf discs, 227
synthesis changes, cytokinin-induced adventitious bud formation, Norway spruce, 1174
Proteinaceous inhibitor
inhibition of potato invertase, 381
purification and partial characterization, potato, 386
Protein kinase, soluble and membrane-bound calcium-dependent, barley, 919
Protoplasts
barley mesophyll, vacuole tonoplasts, amino acid transport, 123
rye, cryopreservation, vitrification, 666
tobacco mesophyll, 1,3-β-glucanase, chitinases and "osmotins," 520
volume at low water potentials, photosynthesis maintenance, droughted wheat, 733
Pyrenoid, morphology, ribulose-1,5-bisphosphate carboxylase, *Euglena gracilis*, 802

R

Radish, currents around lateral roots, two-dimensional vibrating probe study, 543
Raphanus sativus (*see* Radish)
Respiration
alternative oxidase and, germination, corn seedling, 755
mitochondrial, substrate concentration, squared Michaelis-Menten function, 265
NaD-specific isocitrate dehydrogenase, mitochondria, castor bean, 147
seedling chilling responses, corn genotypes, 761
Rhizobium, nearly isogenic pea lines, development, partial characterization, 983
Rhizobium meliloti
exopolysaccharide mutants, nodule formation, alfalfa, 368
induction of *nod* genes, flavonoids, alfalfa seed, 116
metabolism of tryptophan and tryptophan analogs, 1009
Ribonuclease, extracellular, induction upon phosphate starvation, tomato, 970
Ribonucleic acid, chloroplast tRNas in senescing bean leaves, aminoacyl-tRNa synthetases, 136
Ribonucleic acid, messenger
accumulation, intact plastids for nitrate reductase activity, squash, 434
α-amylase, heat shock proteins, heat-stressed barley aleurone cells, 1133
Ribulose-1,5-bisphosphate carboxylase, localization with reference to pyrenoid morphology, chloroplasts, *Euglena gracilis*, 802
Ribulose-1,5-bisphosphate carboxylase/oxygenase
activity in guard cells, stomatal opening, pea, 246
degradation by lysates, mechanically isolated chloroplasts, wheat leaves, 1215
inhibition by 2-carboxyarabinitol-1-phosphate, 867
light activation in spinach, 110
substrate for transglutaminase, alfalfa, 88
Rice, transient gene expression, airgun apparatus, 334
Ricinus communis (*see* Castor bean)
Root
barley, potassium-dependent changes, membrane-associated proteins, 1128
cell vacuoles of *Plantago* species, salt tolerance and sensitivity, patch clamp studies, 23
corn
calcium and calmodulin effect, pH formation, 850
subcellular localization, calcium-stimulated phospholipase D, 672
cucumber, iron uptake mechanism, 908
Eucalyptus gunnii hook, flavonoid accumulation, 1148
gravitropism, auxin movement, corn, 792
hypoxia, reduction of leaf growth, *Populus trichocarpa*, 1021
nodule, response to NH_3, soybean, 268
oat, vacuolar H^+/Ca^{2+} exchanger, reconstitution, 340
primary, gravitropic curvature, corn, 310
radish, currents around lateral roots, vibrating probe study, 543
tomato
chitinase subcellular localization, *Fusarium oxysporum*, 1108
gold cytochemistry, pectic components in cell surface interactions, 995
wheat, ubiquitin pool modulation, high temperature stress, 740
Rubber polymer, enzymatic synthesis, *Parthenium argentatum*, 816
Rye, protoplasts, cryopreservation, vitrification, 666

S

Saccharum officinarum (*see* Sugarcane)
Sainfoin, thermal dependence of glutathione reductase, 363
Salicylhydroxamic acid, inhibition of dissolved inorganic carbon concentrating process, unicellular green algae, 630
Salt, -tolerant and -sensitive *Plantago* species, patch clamp studies, root cell vacu-

oles, 23
Scenedesmus
photosynthesis, systems for concentrating CO_2, bicarbonate, 622
salicylhydroxamic acid inhibition, dissolved inorganic carbon concentrating process, 630
Seed
alfalfa, flavonoids, induction of rhizobial *nod* genes, 116
bean, α-amylase inhibitor, 703
development and germination, water relations, muskmelon, 1029, 1038, 1046
Echinochloa crus-galli, proteins in cellular membranes, dormancy to germination, 427
Gleditsia triacanthos endosperm, cell wall carbohydrates, 931
Seedling
corn
catalase activity, isozyme protein, 375
chilling responses, genotypes, 761
nitrate reduction, carbon dioxide-limited photosynthesis, 286
respiration and alternative oxidase, germination, 755
transpiration and hydraulic conductance, root temperature, 855
cucumber, developmental stages, 1075
Norway spruce, cytokinin-mediated adventitious bud induction, 1174
pea
blue light-mediated protein phosphorylation, 179
shoots and cotyledons, α-amylase characterization, 1154
soybean, water deficit, abscisic acid, 205
Senecio vulgaris, triazine resistance, 954
Senescence
bean leaves, chloroplast tRNas, aminoacyl-tRNa synthetases, 136
peptidase activity, gibberellic acid, pea ovaries, 1070
photosynthetic decline, high temperature stress, maturation of wheat, 648
stomatal aperture and, antibiotics, barley, 696
Sethoxydim, -tolerant maize tissue cultures, 1220
Shoot
mulberry, lodging safety factor, succinic acid 2,2-dimethylhydrazide, 12
pea seedling, characterization, α-amylase, 1154
Silene armeria, gibberellins and stem growth, relation to photoperiod, 1094
Sodium, -stimulated growth, enhanced photosynthesis, *Panicum coloratum*, 1169
Solanum tuberosum (*see* Potato)
Sorghum
gas exchange rates, genetic variation, 1211
herbicide antidotes, glutathione *S*-transferase isozymes, 467
Soybean
accumulation of apoplastic iron, 17
anaerobic response, 401
branches and pods on branches, foliar boron applications, 602
chloroplast and mitochondrial DNA polymerases, 939
cotton and, clomazone metabolism, 777
effective and ineffective nodules, regulation of enzymes, sucrose and hexose metabolism, 346
nitrite photoreduction, inhibition by oxygen, 862
nitrogen fixation of nodulation mutants, nitrate, 1142
nodules, mechanism, nitrogenase inhibition, 1101
photosynthesis and growth, solar ultraviolet-B radiation, drought, 141
root nodule response to NH_3, 268
seedling, water deficit, abscisic acid, 205
uptake and accumulation of bentazon, 1121
young plants, xylem-to-phloem transfer, organic nitrogen, 797
Spectroscopy, pulse-modulated, nitrogenase inhibition, soybean nodules, 1101
Spermidine, uptake by mitochondria, *Helianthus tuberosus*, 690
Spinach
chloroplastic carbonic anhydrase, 37
inhibition of zeaxanthin formation, dithiothreitol, leaves and chloroplasts, 293
leaf, quenching of chlorophyll fluorescence, zeaxanthin, 302
light activation, ribulosebisphosphate carboxylase/oxygenase, 110
nitrite photoreduction, inhibition by oxygen, 862
oxidation *vs.* reductive detoxification of SO_2, chloroplasts, 846
regulation of nitrate reductase, 684
subcellular compartmentation of uridine nucleotides, nucleoside-5′-diphosphate kinase, 637
Spinacia oleracea (*see* Spinach)
Spruce
emission of volatile sulfur compounds, 560
seedling development, cytokinin-mediated adventitious bud induction, 1174
Squash, intact plastids for nitrate reductase activity, mRNa accumulation, 434
Stalk, elongation in corn, estimation, carbon and nitrogen allocation, 79
Starch
-deficient endosperm mutants of maize, sugar metabolism, developing kernels, 990
synthesizing enzymes, permeabilized potato tuber slices, 234
Stem
growth and gibberellins, relation to photoperiod, *Silene armeria*, 1094
tobacco, growth and floral bud formation, feruloylputrescine and caffeoylputrescine, 924
Stomata, aperture, antibiotics, barley, 696
Succinic acid 2,2-dimethylhydrazide, lodging safety factor, mulberry tree shoots, 12
Sucrose
regulation of enzymes of metabolism, effective and ineffective nodules, soybean, 346
transition from enzymatic to acid hydrolysis, acid limes, 168
Sugar
analogs, cell wall-associated enzymes, corn, 413
metabolism in developing kernels, starch-deficient endosperm mutants, maize, 990
water deficit and abscisic acid, shoot *vs.* root growth, soybean seedlings, 205
Sugarcane
hydrolization of natural polysaccharides, fructanase, 679
leaf, kinetic and structural properties, NaDP-malic enzyme, 66
Sulfite, oxidation *vs.* reductive detoxification, spinach chloroplasts, 846
Sulfur, emission of volatile compounds, spruce trees, 560
Sunflower
accumulation of apoplastic iron, 17
onset and release of embryo dormancy, endogenous abscisic acid, 1164
Synechococcus, prokaryote, circadian rhythm, 531
Synechocystis, temperature-induced changes, fatty acid composition, 1062

T

Temperature
high
photosynthetic decline, maturation of wheat, 648, 654
ubiquitin pool modulation, wheat roots, 740
-induced changes in fatty acid composition, cyanobacterium, 1062
photoinhibition in wild grape, 487
respiration and alternative oxidase, germination, corn seedling tissues, 755
Tetrahydroxyproline, lack of repetitive blocks, chenopod extensin, 327
Threonin, -rich extensin from corn, 316
Tobacco
alloploidy, polymorphism, photosystem I subunit, 273
chloramphenicol acetyl transferase protein, attack by insects, 500
cytokinins and flower bud formation, 565
flower bud regeneration in pedicel explants, developmental state of tissue, 582
growth and floral bud formation, feruloylputrescine, caffeoylputrescine, 924
immunological characterization, ornithine transcarbamylases, 1205
leaf
subcellular localization, cadmium and cadmium-binding peptides, 1086
water vapor pressure deficit, photochemical and fluorescent yields, 608
mesophyll protoplasts, 1,3-β-glucanase, chitinases and "osmotins," 520
nitrate reductase deficient mutants, 659
O_2-resistant photosynthesis, photorespiration, catalase activity, 352
plasma membrane calcium influx, bacterial induction, K^+/H^+ and hypersensitive responses, 215
transgenic, expression and processing, *Arabidopsis* 2S albumin, 899
Tomato
abscisic acid-induced ethylene production, 48
anionic peroxidase gene expression, fungal resistance, 276
aurea mutant, altered phytochrome regulation, greening, 1004
chlorogenic acid:glucaric acid caffeoyltransferase, properties, activity changes, 41
ethephon effect on protein degradation, accumulation of pathogenesis-related proteins, 227
fruit cell wall, 642
fruit development, polyamine levels, interaction with ethylene, 547
immunological characterization, ornithine transcarbamylases, 1205

induction of extracellular ribonuclease, phosphate starvation, 970
light quality and quantity, photoregulation, anthocyanin production, 1191
root, gold cytochemistry, pectic components in cell surface interactions, 995
Tomato, cherry, γ-irradiation effects, 1-aminocyclopropane-1-carboxylic acid metabolism, 577
Tonoplasts
H^+/Ca^{2+} exchanger, reconstitution, oat, 340
vacuole, amino acid transport, barley mesophyll protoplasts, 123
vesicles in corn roots, calcium and calmodulin effect, pH formation, 850
Transglutaminase, rubisco substrate, alfalfa, 88
Transpiration, hydraulic conductance and, root temperature, corn seedling, 855
Triazine, resistance in *Senecio vulgaris*, 954
Triticum aestivum (*see* Wheat)
Trigonella foenum-graecum (*see* Fenugreek)
Tropaeolum majus (*see* Nasturtium)
Tryptophan, tryptophan analogs and, metabolism, *Rhizobium meliloti*, 1009
Tumorigenesis, crown gall disease and hairy root disease, 281

U

Ubiquitin, pool modulation, high temperature stress, wheat roots, 740
Ultraviolet-B radiation, drought and, photosynthesis and growth, soybean, 141
Uridine, nucleotides, compartmentation, barley and spinach leaves, 637

V

Velvetleaf, uptake and accumulation of bentazon, 1121
Vernalization, light quality and, late-flowering mutants, *Arabidopsis thaliana*, 770
Verticillium albo-atratrum, anionic peroxidase gene expression, fungal resistance, tomato, 276
Vesicles, plasma membrane, sealed inside-out and right-side-out, beet, 871
Vicia faba (*see* Broad bean)
Vigna unguiculata (*see* Cowpea)
Violaxanthin, abscisic acid precursor, water-stressed dark-grown bean leaves, 551
Vitis californica (*see* Grape, wild)
Vitrification, cryopreservation, rye protoplasts, 666

W

Water
deficit, abscisic acid, soybean seedlings, 205
-ethanol extract, fructan precipitation, oats and barley, 767
low potentials, photosynthesis maintenance, droughted wheat, 733
potential, polyethylene glycol exclusion, solution-saturated filter paper, 462
relations, seed development and germination, muskmelon, 1029, 1038, 1046
-restricted conditions, nitrogen fixation, broad bean nodules and bacteroids, 595
stress
light energy dissipation, *Digitalis lanata*, 1053
protein differences in pine needles, shaded or unshaded, 1244
-stressed dark-grown bean leaves, violaxanthin, abscisic acid precursor, 551
vapor pressure deficit, photochemical and fluorescent yields, tobacco leaf tissue, 608
Wheat
accumulation of light-harvesting chlorophyll *a/b* protein II, chloramphenicol, 1233
droughted, low water potentials, photosynthesis maintenance, 733
leaf, rubisco degradation by lysates, 1215
maturation, photosynthetic decline, high temperature stress, 648, 654
regulation of cell wall extensibility, gibberellic acid, 242
root, ubiquitin pool modulation, high temperature stress, 740
transient gene expression, airgun apparatus, 334

X

Xylem, -to-phloem transfer of organic nitrogen, young soybean plants, 797

Z

Zea mays (*see* Corn)
Zeatin riboside, reduction of leaf growth, root hypoxia, *Populus trichocarpa*, 1021
Zeaxanthin
inhibition of formation by dithiothreitol, spinach leaves and chloroplasts, 293
quenching of chlorophyll fluorescence, spinach leaves, 302
Zeins, extraction and quantitation, modified *opaque*-2 maize, 191
Zinc sulfate, phycobiliprotein and colorless linker polypeptides, fluorescence, *Microcystis aeruginosa*, 358
Zucchini, immunological characterization, ornithine transcarbamylases, 1205